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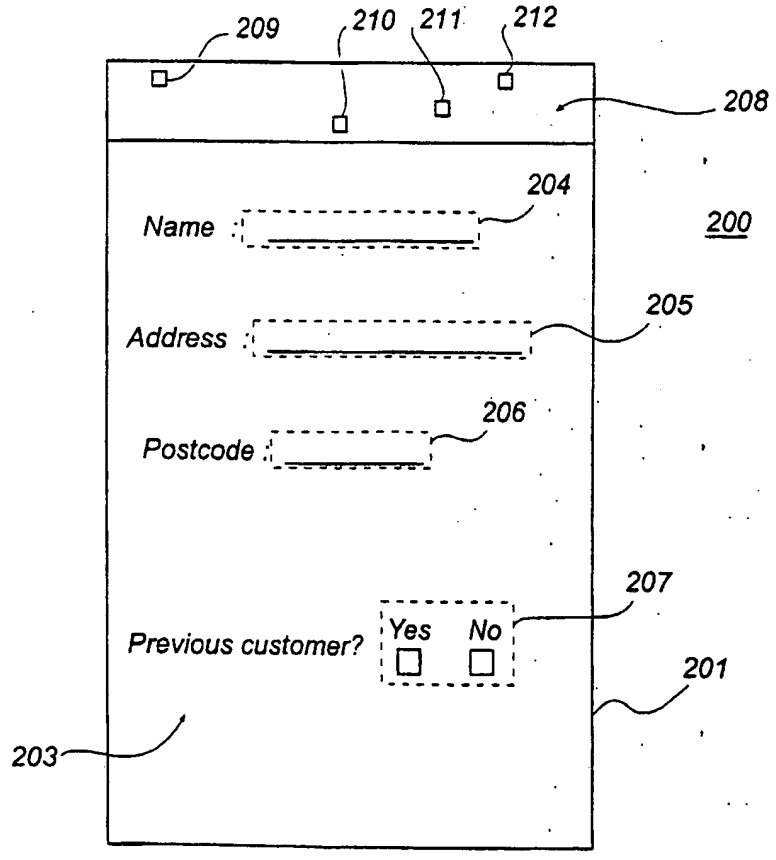
(54) Title: METHOD AND DEVICE FOR PROCESSING OF INFORMATION



(57) Abstract: This invention concerns a method for generating a form, a method for recording form data, which arises when a corresponding form is completed, for an information entry, and a corresponding form. The form comprises a form layout with at least one entry field which is printed on a base in the form of a sheet. It is characterised in that the base is provided with a position-coding pattern, the entry field being intended to be completed using a user unit which is arranged to optically detect positions on the sheet, utilising the position-coding pattern, for digital recording of information entered in the entry field; and by and identity pattern on the sheet, a marking of the identity pattern using the user unit being intended to be detected by the user unit, utilising the position-coding pattern, as a set of positions which identify the form layout.

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METHOD AND DEVICE FOR PROCESSING OF INFORMATION

Field of the Invention

This invention concerns a method in a system comprising at least one printer, for generating a form, a corresponding arrangement, and a digital storage medium containing a corresponding computer program. The invention also concerns a method in a computer system for recording form data for an information entry, a corresponding arrangement and a digital storage medium containing a corresponding computer program. The invention also concerns a form.

Technical Background

Forms and the like are used to a considerable extent in today's society. The aim of such forms is to ensure that a user fills in the correct information and that this is carried out in a structured way. Therefore forms usually consist of a sheet of paper containing printed form layouts, with instructions concerning what information is to be filled in and directions concerning where on the sheet this is to be carried out.

With modern computer technology it is possible to automatically record the information which is entered on a form. The simplest way of doing this is with a flat-bed scanner connected to a computer system. In a simple embodiment an information file is then created in a graphical format (for example in tiff format). Such simple recording makes it possible to create a copy of the form at a later stage. The copy can then be printed and interpreted manually.

It is also possible to process the created file by OCR technology which can recognise text, both in the layout of the form and in the fields which have been filled in by a user. Creating a corresponding database form from a scanned image of a form requires, however, comprehen-

sive and complicated image analysis software. The identity and orientation of the form is to be determined and the entries on the form are to be identified and distinguished from the layout of the form. In addition there are many potential sources of error in this process, which means that it must be monitored carefully.

Automatic recording of information which is entered in various forms also requires completed forms to be sent to a place where they can be recorded by a scanner, as it cannot of course be assumed that, for example, an individual filling in a form for a market research survey will have access to an advanced flat-bed scanner with the comprehensive and expensive software that is required for the subsequent image analysis of the scanned image.

The use of a flat-bed scanner also makes considerably more difficult mobile recording of a form in the field, for example in connection with market research surveys.

Summary of the invention

An object of this invention is to completely or partially solve the above-mentioned problems.

This object is achieved by a method in a system for generating a form according to claim 1, an arrangement according to claim 8, and a digital storage medium containing a computer program according to claim 9; a method in a computer system for recording form data for an information entry according to claim 10, an arrangement according to claim 15, and a digital storage medium containing a computer program according to claim 16; a form according to claim 17 and a method according to claim 21.

According to a first aspect of the invention, a method for generating a form is provided in a system comprising at least one computer and at least one printer. The method comprises the steps, in any order: printout, by means of said printer, of a form layout, comprising at

least one entry field, on a base in the form of a sheet, which base is provided with a position-coding pattern, said entry field being intended to be completed using a user unit, which is arranged to optically detect positions on the base utilising the position-coding pattern, for digital recording of the information entered in the entry field; and printout, by means of said printer, of an identity pattern on said base, a marking of the identity pattern using said user unit being intended to be detected by the user unit, utilising the position-coding pattern, as a set of positions, which identify said form layout.

Such a position-coding pattern can be designed in the way described in Applicant's Patent Applications WO 00/73983 and PCT/SE00/01667, which are herewith incorporated by reference. Moreover, reference is made to WO 01/16691, the content of which is included in the specification by reference.

A form which is printed in accordance with the above-mentioned method is thus intended to be completed using a user unit which at the same time records the entered information. When the form has been completed (or before it is completed), the identifying pattern is marked or a line is drawn through it using the user unit. This operation can link the information entered in the form to a particular database form in the computer system. This means at the same time that the information entered in a particular entry field can be linked to a particular information entry in the database form, that is position information within a particular area on the sheet is connected to a particular entry on the form. The structuring of the completed information is thus carried out automatically.

Recording of a form created in accordance with the above-mentioned method does not therefore require a flatbed scanner equipped with advanced software for image analysis. The completion of the form and recording of the

information entered is carried out in a single stage. The form does not therefore need to be sent away, but can, for example, be retained as a copy of what was entered on it. Mobile recording can be carried out in the field. The computer system can process the entered information in a simple and structured way and the danger of errors arising in the recording is reduced.

Generally according to the invention, the positional relationship of a form layout and a position-coding pattern is established so that they may be co-ordinated.

Boxes to be ticked or a set of parallel juxtaposed lines can preferably be part of the identity pattern. These are also found in other contexts and a user understands intuitively how they are to be marked.

The positions which identify the form layout can preferably also consist of a description of the scale in which said layout has been printed in relation to the position-coding pattern. This makes it possible for a recording system to compensate for a printout which, for example, has been made in too small a scale. As an alternative, the printer may be provided with a position-coding pattern reader device, in order to facilitate the printing of a form layout that is adapted to the position-coding pattern.

According to a preferred embodiment of the method according to the invention, this additionally comprises the step: generation of a database form in the computer system, comprising an information entry which corresponds to the entry field of the printed form, information corresponding to said digital recording of information entered in the entry field being intended to be stored in the information entry. This makes it possible for the same system which prints the form, or a system communicating with this, to carry out the recording of the entered information into a database form. A form which is printed can then suitably be provided with an identifying pattern which not only identifies the form layout

but also the individual printed form, which is thus given a unique identifying pattern.

The information which is stored in the information entry can then preferably consist of output data when the computer system applies a rule to input data corresponding to said digital recording of information entered in the entry field. The rule's output data is then a processing of its input data. This also permits interpretation of information entered in the information field. This aspect of the invention also comprises a corresponding arrangement for the generation of a form and a digital storage medium containing a computer program for generating a form. These have advantages corresponding to those of the method and can also be varied in an essentially similar way.

According to a second aspect of the invention, a method is provided in a computer system for inputting form data into an information entry, said form data arising when an entry field in a form, which comprises a form layout printed on a base in the form of a sheet, is completed using a user unit. The method comprises the following steps, in any order: recording of a first set of position information corresponding to form data which arises when the entry field is completed by means of the user unit, by the base being provided with a position-coding pattern and by the user unit being arranged to optically detect positions on the base utilising the position-coding pattern; and recording of a second set of position information which arises in the same way when an identity pattern which is printed on the sheet is marked by the user unit, which second set of position information is intended to identify said form layout.

This aspect of the invention goes together with the first aspect of the invention like a lock and key and thus has corresponding advantages.

The information entry can preferably be incorporated in a database form. This enables a complete corresponding virtual form to be created in the computer system.

A rule is suitably applied to the first set of position information so that output data from the rule which is obtained by processing the first set of position information constitutes input data for the information entry. This also permits field-specific interpretation of information entered in the information field.

The format of the output data of the rule is preferably from the group: Boolean variable, whole number, real number, text string or a graphical format. These formats can then be processed in various general ways by the computer system concerned or by another computer system to which this information is transmitted.

The computer system can preferably be contained in the user unit. This enables both mobile recording and interpretation of information which is entered on a form. Processed data can thereafter be forwarded to other systems.

In this aspect of the invention there is also a corresponding arrangement for entry of form data and a digital storage medium containing a computer program for entering form data. These have corresponding advantages to those of the method and can also be varied in essentially corresponding ways.

According to a third aspect of the invention, a form is provided comprising a form layout, with at least one entry field, which is printed on a base in the form of a sheet. The form is characterised in that the base is provided with a position-coding pattern, said entry field being intended to be completed using a user unit, which is arranged to optically detect positions on the sheet, utilising the position-coding pattern, for digital recording of information entered in the entry field; and by an identity pattern on said sheet, a marking of the identity pattern using the user unit being intended to be de-

tected by the user unit, utilising the position-coding pattern, as a set of positions which identify said form layout.

The form has advantages corresponding to the method according to the first aspect of the invention.
The base in the form of a sheet preferably consists of a sheet of paper.

Brief Description of the Drawings

Fig. 1 shows a computer system in which the methods according to the invention can be carried out, a base in the form of a sheet and a user unit of a preferred type.

Fig. 2 shows a form according to the invention.

Fig. 3 shows an embodiment of the identifying pattern.

Fig. 4 shows the application of a number of rules with position information as input data.

Fig. 5 shows a flow chart describing a method for generating forms according to the invention.

Fig. 6 shows a flow chart describing a method for recording form data for an information entry.

Description of Preferred Embodiments

Fig. 1 shows a computer system 100 in which the methods according to the invention can be carried out, a base 101 in the form of a sheet and a user unit 102 of a preferred type. The user unit preferably comprises an optical sensor.

The described computer system 100 comprises a personal computer 103 to which is connected a display 104 and a keyboard 105. The methods according to the invention can, however, be applied in both larger and smaller computer systems. In the described computer system 100 there is also a printer 106. This can be a laser printer or an ink-jet printer. Other types of printers are also possible.

Fig. 1 shows as mentioned also a base 101 in the form of a sheet of the type which is intended to be used in connection with the invention. The base 101 can consist of a sheet of paper, but other materials, such as plastic or a laminate of several materials, are also possible.

The base 101 is provided with a position-coding pattern 107 (shown enlarged). This can be arranged by means of printing. It is, however, also possible to print the position-coding pattern 107 using the computer systems printer 106. The position-coding pattern 107 is so arranged that if a part of the pattern of a certain minimum size is recorded optically then this part of the pattern's position in the pattern and hence on the base can be determined unambiguously. The position-coding pattern can advantageously be of such a type as shown in Applicant's previous Applications WO 00/73983 and PCT/SE00/01667, where each position is coded by a plurality of symbols and where one symbol is used to code a plurality of positions. The position-coding pattern 107 shown is constructed as shown in WO 00/73983, where a larger dot represents a "one" and a smaller dot represents a "zero". It is, however, also possible to design the position-coding pattern 107 as described in PCT/SE00/01667, where different displacements of a dot in relation to a raster code different symbol values.

Fig. 1 also shows a user unit 102 designed as a pen. The user unit 102 has a pen point 108 which can be used to write text and numbers or draw figures on the base. The user unit 102 also comprises optics which, utilising the position-coding pattern 107 on the base 101, can detect positions on this. When a figure 109 is drawn on the base 101, a sequence of positions on the base 101 are therefore detected, corresponding to the movement of the user unit 102 over the base 101. This sequence of positions forms a digital record of the figure 109 drawn on

the base 101. In the same way, hand-written numbers and letters can also be recorded digitally.

The information recorded by the user unit 102 can be transmitted to another unit, such as a personal computer or a cellular mobile telephone, for further processing, storage or transmission. This can be carried out using a cable, by means of an infrared link, or preferably via a short-range radio link, for example in accordance with the BLUETOOTH (trademark) standard. The information which is transmitted can be the direct sequence of positions in the form of a set of pairs of co-ordinates or a polygon train which represents this set. The information may also be stored locally in the user unit and transmitted later, when a connection is established.

Fig. 2 shows a form 200 according to the invention. The form 200 consists of a base (or other surface) 201 of the type previously described, provided with a position-coding pattern (not shown), as described in connection with Fig. 1. A form layout 203 is printed on the base 201. The form layout 203 comprises a plurality of entry fields 204-207.

The form 200 is used to collect information. The information arises when a user writes, for example, text or a number in any of the entry fields 204-207. This can concern a piece of text such as a name or an address. It can be a whole number, such as the age of a person in whole years, or a real number, for example a patient's body temperature in degrees Celsius to two decimal places. It can also be the reply to a multi-choice question. There can also be other types of entered information, which will be described below. The user may preferably download the form layout from an Internet server. The layout may also be stored in other computer systems, such as a user unit of the above-mentioned type. The user unit may then communicate directly with the printer. While the surface disclosed in the figure comprises a single, discrete surface such as a sheet of paper, the term surface as

used herein may refer to multiple surfaces or multiple pages of a multi-page form.

When an entry field 204-207 is completed by a user using a user unit of the type described in connection with Fig. 1, the user unit records a sequence of positions corresponding to a digital record of the entered information. The user completes all the required entry fields in the form. The recorded information can then be processed or stored locally in the user unit. Alternatively, it can be transmitted to another computer system for processing or storage. The whole of the recording computer system can be incorporated in the user unit. The form 200 also comprises an identifying pattern or identity pattern 208, which is marked when the entry fields 204-207 of the form layout 203 are completed. The marking can, for example, consist of parts of the identifying pattern being marked with a cross, a line being drawn through it or by it being circled. Alternatively, the user could for example be invited to fill in a missing feature in a figure.

It is also possible to let a larger scale position-coding pattern, printed by the printer on top of the original position-coding pattern, constitute the identifying pattern. The user unit must then be capable of detecting both types of position-coding patterns.

In the example shown the identifying pattern consists of four boxes 209-212 to be marked with a cross. When these are marked with a cross using the user unit, a set of positions is recorded which identifies the form layout 203 which has been completed. At the same time the recording computer system is informed about which coordinates the position-coding pattern codes. If the pattern is continuous over the form, the computer is also informed about the coordinates for the complete form.

The sequence of completing the entry fields 204-207 and the identifying pattern 208 can be reversed. In this way information arises indicating how the digitally re-

corded information which arose when the entry fields 204-207 were completed is to be processed. The entry fields 204- 207 and the four boxes may be completed in any order and the information is still usable.

The identifying pattern 208 can also be utilised to record the scale in which the form layout has been printed in relation to the position-coding pattern. The boxes 209- 212 may be placed near the different corners of the sheet in order to facilitate this and provide higher resolution. The information can then be used to normalise the position information which arises, so that the correct position information is associated with the correct information entry. As an alternative to this method of normalising, the printer can be provided with a position-coding pattern reading device, in order to allow the printer to adapt the form layout to the position-coding pattern. At such a printer, another solution is to print the form in the normal manner and, during the printing process, sense the position coordinates and feed back to the computer system, the position coordinates corresponding to a reference position at the form layout and some scale information.

Such a method then generally involves the steps of: printout, by means of a printer, of a form layout, comprising at least one entry field, on a base in the form of a sheet; detecting, in connection with the printout, of positions in a position-coding pattern with which the base is provided, by means of a reading device in the printer, and transferring of information, regarding the positional relationship between the form layout and the position-coding pattern, to a computer system.

The identifying pattern is preferably overspecified, that is, a marked identifying pattern results in more position information than what is required to identify a form layout unambiguously. This makes possible the above-mentioned recording of scale or other information.

A user who wants to generate a number of forms preferably acquires a pack of sheets which are already provided with the preferred position-coding pattern and loads a number of such sheets into his/her printer. All the sheets in such a pack can be identical but it is also possible for each sheet in a pack to be unique and code a separate coordinate area. The user can also in principle print the position-coding pattern himself using a printer having sufficiently high printing resolution. The position-coding patterns described in Applicant's previous applications WO 00/73983 and PCT/SE00/01667 are able to define a very large total area (for example counted in the number of A4 pages) with good resolution. The areas which are used in the packs of sheets that a user can acquire are preferably known to the computer system which records the form information. It could be appropriate to reserve a certain part of the above-mentioned total area for form applications. When all the sheets in a pack are identical, the system knows where on a sheet a position in the position-coding pattern is located. If a pack contains unique sheets (at least pack-unique), the system also knows on which sheet a position in the position-coding pattern is located. This makes possible parallel recording of a plurality of forms. Parallel recording can also be achieved when all the sheets are identical by recording the identities of the user units so that the system can connect the information from different user units with different database forms. This can also be achieved without knowledge of user unit identity, if all users mark their (unique) identifying patterns after each form field entry.

Such a database form may be contained in an Internet server.

If the printer can print the form layout and identifying pattern accurately, the absolute positions in the position-coding pattern which are recorded when the boxes are marked with a cross can be utilised to identify the

document. If the accuracy is insufficient, the relative positions of the different items, such as boxes, in the position-coding pattern can be used instead.

As shown above, the identifying pattern 208 can be boxes 209-212 which are marked with a cross. However, it can also consist of, for example, dots which are to be circled. An advantage of marking boxes 209-212 with a cross is that the width and intensity of the four lines which make up the box can be made such that the position recording temporarily ceases when the lines of the box are passed when a cross is marked in the box. This means that the system can determine more precisely where in the position-coding pattern the box is located.

This principle is also used in the embodiment of the identifying pattern 300 which is shown in Fig. 3. Here the pattern 300 consists of a set of parallel lines 301, 302, etc., of different widths arranged beside each other as a bar-code. If these are printed on a position-coding pattern and marked by having a line drawn through them essentially at right angles to the lines 301, 302 etc. using a user unit of the type described, the position recording can be commenced and terminated several times. The positions which are recorded can be used to identify a form layout.

The above-described method for generating a form may be used in connection with a large number of different activities such as market surveys, tests, income-tax returns, etc.

Fig. 4 shows the application of a number of rules or functions with position information as input data. On the left side of the Figure is shown a number of entry fields 401-404, which are completed by a user. On the right side of the figure is shown the information 405-408 which is inserted in the corresponding information entries in a database form when field-specific rules 409-412 of various kinds are applied to the items of position information that are generated when the form is complet-

ed. Output data from such a rule is generally obtained by processing the rule's input data.

A user has entered a name 413 in a first entry field 401. On the position information which then arose, a rule 409 is applied, which corresponds to OCR recognition of text on a sheet of paper. Output data 405 from this rule is thus a text string which can be stored or processed in the computer system. It is also possible to store the position information in an unprocessed state, for example if a signature is to be able to be reproduced.

In a second entry field 402 the form layout consisted of a scale 414 from 1 to 10 where a user were to describe, for example, how satisfied he was with a particular product. The user has here put a line 415 slightly to the right of the centre. When a rule 411 is applied to the position information which arose when the user marked the line 415, the output data 406 is a real number 6.5 which can be stored in an information entry in a database form.

In a third entry field 403 a user was to answer yes or no to a question. The form layout 416 consists of the words "yes" and "no" with associated boxes to be marked with a cross. The user has put a cross in the box signifying no. When a rule is applied to the position information which arose, the output data 407 is a logical or Boolean zero.

In a fourth entry field 404 a user was to answer, for example, how many items of a particular product he wants to order. The form layout 417 consists of a number of circles in which the user is to mark a cross. The user has marked a cross in three circles. When a rule is applied to the position information which arose, the output data 408 is the whole number 3.

Fig. 5 shows a flow chart, which describes a method 500 for generating of forms according to the invention. The invention also concerns a corresponding arrangement and corresponding software. In a simple embodiment this

comprises three steps which can be carried out in any order. In a first step 501 the required form layout is printed. Needless to say, the actual form layout may be accompanied by graphics and text, that is not necessarily strictly related to the form functionality. In a second step 502 the identifying pattern is printed, which corresponds to the form layout. In a possible third step 503 a database form is created in an associated computer system. The database form comprises a virtual copy of the real form now created. Of course printing of the layout and printing of the identifying pattern could be performed simultaneously. In fact, also the position-coding pattern could be printed simultaneously. The layout may in principle also be printed before the position-coding pattern.

If the printer prints both the form layout and the position-coding pattern in one run, no identifying pattern is required, since the computer program already is aware of the relationship between the form layout and the position-coding pattern. However, if the position-coding pattern is printed in a first run, and the form layout is printed in a second run, some kind of calibration is required.

The printer may be a conventional laser printer or ink-jet printer having a desired resolution for printing the form layout, such as 300 dpi.

The position-coding pattern is preferably printed with a colour material which absorbs infrared light and the form layout may be printed with a colour which does not absorb infrared light. If the sensor is arranged to sense the pattern by means of infrared light only, the layout print does not disturb the reading of the position-coding pattern.

The position coding pattern is preferably arranged on the paper in advance, for instance by an offset printer having a required resolution such as above 1000 dpi, and the paper is inserted in the printer for

printing the form layout on top of the pattern. However, the opposite order is also possible. For example, the position-coding pattern may be applied to the paper by a separate printer after printing the form layout, or with the same printer in the second run. It is also possible to use a copying machine for providing the paper with the form layout and/or the position-coding pattern.

Fig. 6 shows a flow chart which describes a method 600 for recording form data for an information entry. The invention also concerns a corresponding arrangement and corresponding software. The method comprises at least two steps which can be carried out in any order. In a first step 601 a first set of position information is recorded, that is the information which arises when an entry field is completed using a user unit. In a second step 602 a second set of position information is recorded, which arises when an identifying pattern is marked using the user unit.

The scope of protection applied for is not restricted to the embodiments described above. The invention can be varied within the scope of the appended claims.

CLAIMS

1. A method in a system comprising at least one printer for generating a form,
c h a r a c t e r i s e d by the steps, in any order:
- printout (501), by means of said printer, of a form layout, comprising at least one entry field, on a base in the form of a sheet, which base is provided with a position-coding pattern; and
- printout (502), by means of said printer, of an identity pattern on said base.

2. A method according to claim 1, wherein said entry field is intended to be completed using a user unit, which is arranged to optically detect positions on the base utilising the position-coding pattern, for digital recording of information entered in the entry field, and wherein a marking of the identity pattern using the above-mentioned user unit is intended to be detected by the user unit, utilising the position-coding pattern, as a set of positions which identify said form layout

3. A method according to claim 1 or 2, wherein said identity pattern comprises a box intended to be marked with a cross using the user unit.

4. A method according to claim 1 or 2, wherein said identity pattern comprises a set of essentially parallel lines arranged beside each other, intended to be marked by having a line drawn through them essentially at right angles to the lines using a user unit.

5. A method according to any one of claims 1-4, wherein said set of positions which identify said form layout are also intended to constitute a description of the scale in which said form layout has been printed in relation to the position-coding pattern.

6. A method according to any one of claims 1-5, wherein the method also comprises the step: generation (503) of a database form in the computer system, comprising an information entry which corresponds to the entry

fields of the printed form, information corresponding to said digital recording of information entered in the entry field being intended to be stored in the information entry.

7. A method according to claim 6, wherein the information which is stored in the information entry consists of output data, when the computer system applies a rule to the input data comprising said digital recording of information entered in the entry field, the output data of the rule being obtained by processing its input data.

8. An arrangement in a system, comprising at least one computer and at least one printer, for generating a form, characterised by means for causing said printer to print a form layout comprising at least one entry field on a base in the form of a sheet, which base is provided with a position-coding pattern, said entry field being intended to be completed using a user unit which is arranged to optically detect positions on the base utilising the position-coding pattern, for digital recording of information entered in the entry field; and means for causing said printer to print an identity pattern on said base, a marking of the identity pattern using the user unit being intended to be detected by the user unit, utilising the position-coding pattern, as a set of positions which identify said form layout.

9. A digital storage medium, which can be read by a computer system, the storage medium containing a computer program for generating, in a system comprising at least one computer and at least one printer, a form, characterised in that the computer program contains instructions corresponding to the following steps, in any order:

- printout, by means of said printer, of a form layout, comprising at least one entry field, on a base in the form of sheet, which base is provided with a position-coding pattern, said entry field being intended to be completed using a user unit which is arranged

to optically detect positions on the base utilising the position-coding pattern, for digital recording of information entered in the entry field; and

- printout, by means of said printer, of an identity pattern on said base, a marking of the identity base using said user unit being intended to be detected by the user unit, utilising the position-coding pattern, as a set of positions which identify said layout.

10. A method in a computer system for recording form data in an information entry, said form data arising when an entry field in a form, which comprises a form layout printed on a base in the form of a sheet, is completed using a user unit, c h a r a c t e r i s e d by the following steps, in any order:

- recording (601) of a first set of position information corresponding to form data which arises when the entry field is completed using the user unit, by the base being provided with a position-coding pattern and by the user unit being arranged to optically detect positions on the base utilising the position-coding pattern; and

- recording (602) of a second set of position information which in the same way arises when an identity pattern which is printed on the sheet is marked with the user unit, which second set of position information is intended to identify said form layout.

11. A method according to claim 10, wherein the information entry is incorporated in a database form.

12. A method according to claim 11, wherein a rule is applied to said first set of position information and output data from this rule, which is obtained by processing said first set of position information, constitutes input data for the information entry.

13. A method according to claim 12, wherein the format of the output data of the rule is from the group: Boolean variable, whole number, real number, text string or a graphical format.

14. A method according to any one of claims 10-13, wherein the computer system is incorporated in the user unit.

15. An arrangement in a computer system for recording form data for an information entry, said form data arising when an entry field in a form, which comprises a form layout printed on a base in the form of a sheet, is completed using a user unit, c h a r a c t e r i s e d by means for recording a first set of position information corresponding to form data which arises when the entry field is completed using the user unit, by the base being provided with a position-coding pattern and by the user unit being arranged to optically detect positions on the base utilising the position-coding pattern; and means for recording a second set of position information which in the same way arises when an identity pattern, which is printed on the sheet, is marked using the user unit, which second set of position information is intended to identify said form layout.

16. A digital storage medium, which is readable by a computer system, the storage medium containing a computer program for recording form data for an information entry, said form data arising when an entry field in a form, which comprises a form layout printed on a base in the form of a sheet, is completed using a user unit, c h a r a c t e r i s e d in that the computer program includes instructions corresponding to the following steps, in any order:

- recording of a first set of position information corresponding to form data, which arises when the entry field is completed using the user unit, by the base being provided with a position-coding pattern and by the user unit being arranged to optically detect positions on the base utilising the position coding pattern; and

- recording of a second set of position information which in the same way arises when an identity pattern which is printed on the sheet is marked using the user

unit, which second set of position information is intended to identify said form layout.

17. A form comprising a form layout (203), with at least one entry field (204-207), which is printed on a base (201) in the form of a sheet, c h a r a c t e r i s e d in that the base (201) is provided with a position-coding pattern, said entry fields (204-207) being intended to be completed using a user unit, which is arranged to optically detect positions on the base, utilising the position-coding pattern, for digital recording of information entered in the entry field (204-207); and by an identity pattern (208) on said base, a marking of the identity pattern (208) using the user unit being intended to be detected by the user unit, utilising the position-coding pattern, as a set of positions which identify said form layout (203).

18. A form according to claim 17, wherein said base in the form of a sheet consists of a sheet of paper.

19. A form according to claim 17 or 18, wherein said identity pattern comprises a box (209-212) to be marked with a cross, intended to be marked with a cross using the user unit.

20. A form according to claim 17 or 18, wherein said identity pattern comprises a set of essentially parallel lines arranged beside each other, to be marked with a line drawn through them essentially at right angles to the lines using the user unit.

21. A method in a system comprising at least one printer for generating a form,
c h a r a c t e r i s e d by the steps:

- printout, by means of said printer, of a form layout, comprising at least one entry field, on a base in the form of a sheet,

- detecting, in connection with said printout, of positions in a position-coding pattern with which said base is provided, by means of a reading device in said printer, and

- transferring of information, regarding the positional relationship between said form layout and said position-coding pattern, to a computer system.

22. A method for electronically collecting information from forms, the method comprising:

providing a user with a form, the form containing printed indicia on a foreground thereof prompting the user to associate written information with the printed indicia, wherein the form further includes preprinted coded information in the background thereof;

encouraging the user to fill in portions of the form using an implement capable of marking the form, the implement being further capable of detecting the preprinted coded information over which the implement passes and generating a signal in response thereto; and

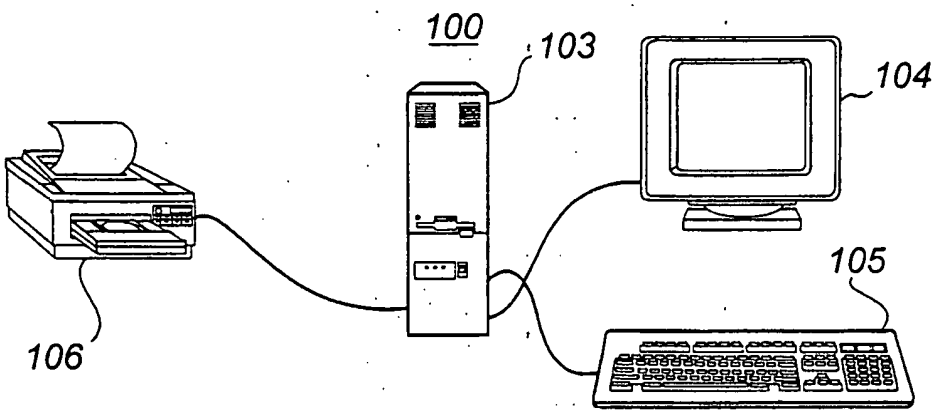
electronically receiving the signal and translating the signal into reflecting an intention of the user.

23. The method of claim 22, further including storing in a database the information reflective of the user's intention.

24. The method of claim 22, wherein the form is printed on a material chosen from the group consisting of paper stock, plastic and laminate.

25. The method of claim 22, wherein the written information is hand-written.

26. The method of claim 22, wherein the implement is in the form of a pen having an optical code reader therein.



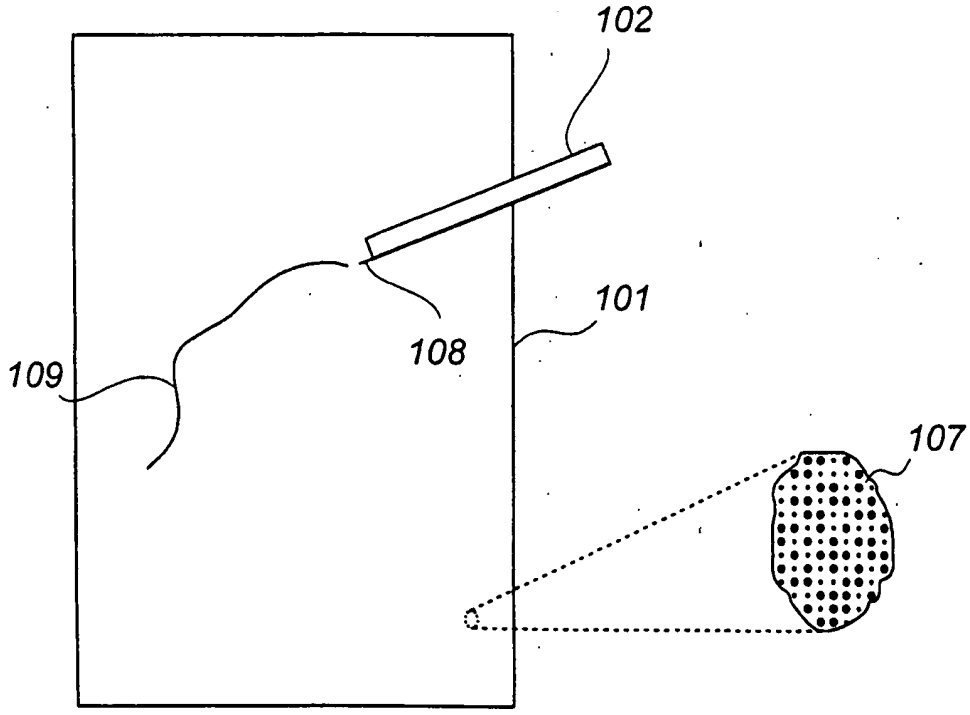


Fig. 1

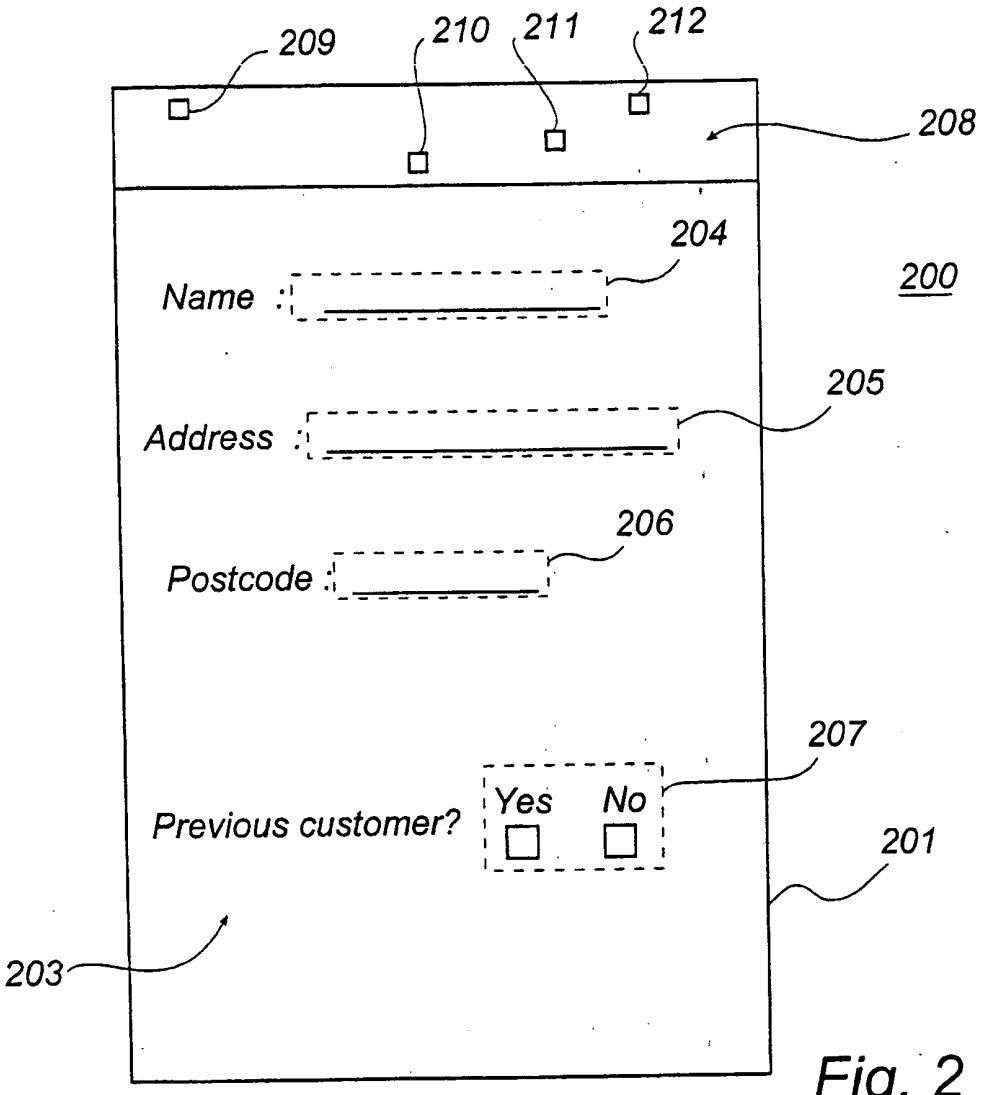

209
210
211
212
208
204
Name :
200
205
Address :
206
Postcode :
207
Yes
No
Previous customer?
201
203

Fig. 2

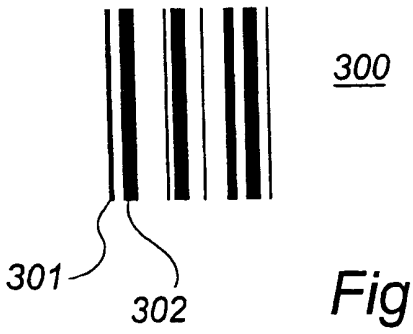

300
301
302

Fig. 3

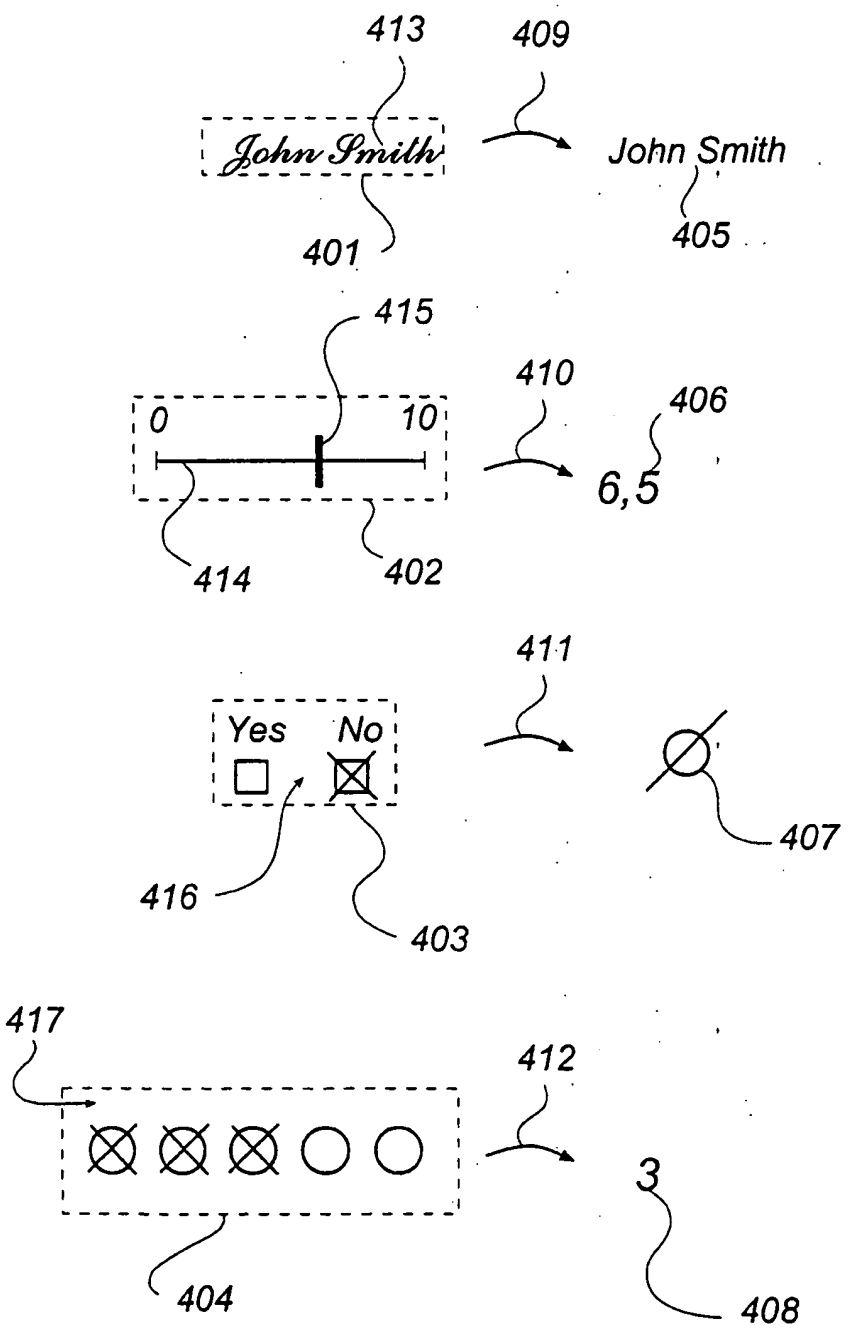

413
409
John Smith
John Smith
401
405
415
410
406
0
10
6,5
414
402
411
Yes
No
407
416
403
417
412
3
404
408

Fig. 4

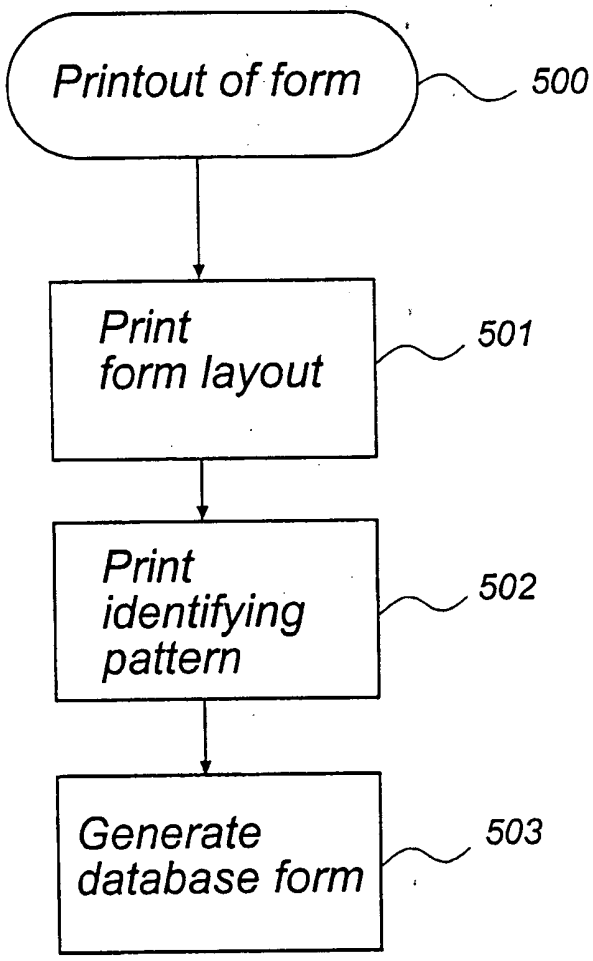

Printout of form
500
Print form layout
501
Print identifying pattern
502
Generate database form
503

Fig. 5

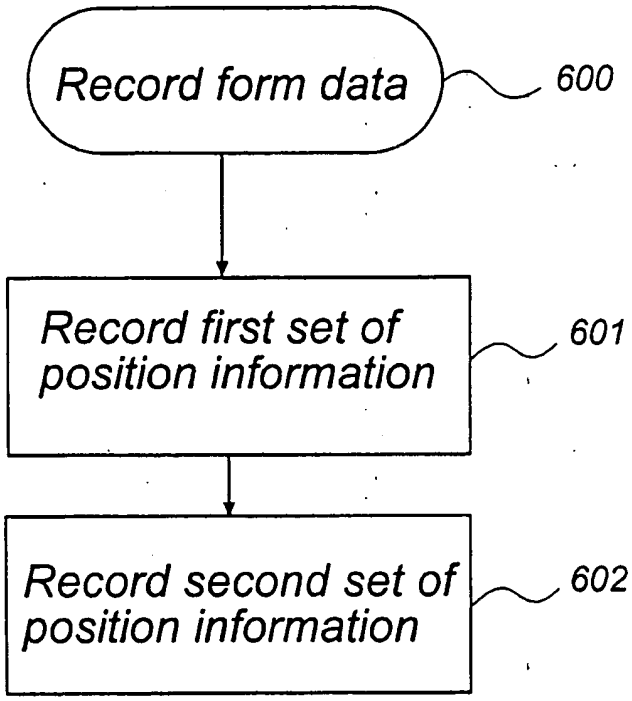

Record form data
600
Record first set of position information
601
Record second set of position information
602

Fig. 6

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 01/00586

A. CLASSIFICATION OF SUBJECT MATTER

IPC7: G06K 11/18, G06K 1/12, G06K 19/06, G06F 3/03
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: G06K, G06F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC-INTERNAL, WPI-DATA

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 9950787 A1 (XEROX CORPORATION), 7 October 1999 (07.10.99), page 2, line 4 - line 13; page 3, line 5 - line 19; page 5, line 12 - line 15; page 12, line 3 - line 23, figures 7-8,10,14-15, claims 1-3, abstract. --	1-26
Y	GB 2306669 A (RICOH COMPANY LTD), 7 May 1997 (07.05.97), page 6, line 9 - line 14; page 8, line 23 - page 9, line 1, figures 1,5, abstract --	1-26
Y	US 5477012 A (SEKENDUR), 19 December 1995 (19.12.95), column 2, line 11 - column 3, line 41, figures 2-5, abstract --	1-26

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 July 2001	17-07-2001
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Pär Heimdal /OGU Telephone No. +46 8 782 25 00

INTERNATIONAL SEARCH REPORT

International application No.
PCT/SE 01/00586

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
E,X	WO 0122208 A1 (SILVERBROOK RESEARCH PTY. LTD.), 29 March 2001 (29.03.01), page 3, line 1 - page 4, line 12, figures 1,4,5-6,8-9, claims 1,3-5,8,18, abstract --	1-26
A	US 5652412 A (LAZZOUNI ET AL.), 29 July 1997 (29.07.97), column 2, line 38 - column 3, line 34; column 6, line 35 - line 39; column 14, line 16 - line 33, abstract -- --------	1-26

INTERNATIONAL SEARCH REPORT

Information on patent family members

02/07/01

International application No.
PCT/SE 01/00586

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		WO 9950736 A	07/10/99
		WO 9950751 A	07/10/99
		GB 9806977 D	00/00/00
		GB 9807001 D	00/00/00
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		GB 9622632 D	00/00/00
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		EP 0892971 A	27/01/99
		WO 9722959 A	26/06/97
		US 5852434 A	22/12/98
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		AU 4725800 A	12/12/00
		AU 4726600 A	12/12/00
		AU 4726900 A	12/12/00
		AU 5375100 A	22/01/01
		AU 5375200 A	22/01/01
		AU 5511700 A	22/01/01
		AU 5662800 A	22/01/01
		AU PQ291299 D	00/00/00
		WO 0072192 A	30/11/00
		WO 0072241 A	30/11/00
		WO 0072242 A	30/11/00
		WO 0072244 A	30/11/00
		WO 0102940 A	11/01/01
		WO 0103015 A	11/01/01
		WO 0103016 A	11/01/01
		WO 0103017 A	11/01/01
		WO 0122207 A	29/03/01
		WO 0122357 A	29/03/01
		WO 0122358 A	29/03/01
US 5652412 A	29/07/97	NONE	